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# **NATIONAL INSTITUTE OF TECHNOLOGY RAIPUR**

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## **B.Tech. (5th Semester)**

## **Assignment No :- 4**

## **Department of Computer Science & Engineering**

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## **Subject: Advance data Structure**

## **Lab Code- CS105201CS**

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## **Date:- 18/08/2025**

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### **Lab Batch No :- 1**

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### **Q.1) Write a program that builds two way linked lists of 5 nodes. The data field of the linked list shall contain the string value:-**

| #include <iostream>  #include <bits/stdc++.h> using namespace std;  struct DNode {  string info;  DNode\* left;  DNode\* right; };  DNode\* createList(int n) {  DNode\* first = nullptr;  DNode\* last = nullptr;   cout << "Enter n string values:\n";  for (int i=1;i<=n; i++){  DNode\* fresh = new DNode;  cin >> fresh->info;  fresh->left = last;  fresh->right = nullptr;   if (first == nullptr) {  first = fresh;  } else {  last->right = fresh;  }  last = fresh;  }  return first; }  int main() {  DNode\* start = createList(5);  cout << "Doubly linked list with 5 nodes created.\n";  return 0; } |
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### **Q.2) Write a program to print all the data values of the above two-way linked list:-**

| #include<bits/stdc++.h>  #include<iostream> using namespace std;  struct DNode {  string info;  DNode\* left;  DNode\* right; };  void showForward(DNode\* start) {  cout << "List elements are:\n";  while (start != nullptr) {  cout << start->info << " ";  start = start->right;  }  cout << endl; }  int main() {  DNode\* head = nullptr;  DNode\* tail = nullptr;   cout << "Enter 5 strings:\n";  for(short i=0;i<5;i++){  DNode\* temp=new DNode;  cin >> temp->info;  temp->left = tail;  temp->right = nullptr;   if (head == nullptr) head = temp;  else tail->right = temp;   tail = temp;  }  showForward(head);  return 0; } |
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### **Q.3) Write a program to add new node in the above two way linked list at the end of the linked list:-**

| #include<bits/stdc++.h>  #include<iostream> using namespace std;  struct DNode {  string info;  DNode\* left;  DNode\* right; };  void displayList(DNode\* start) {  cout << "Current List:\n";  while (start != nullptr) {  cout << start->info << " ";  start = start->right;  }  cout << endl; }  void pushBack(DNode\*& head, DNode\*& tail, string value) {  DNode\* fresh = new DNode;  fresh->info = value;  fresh->left = tail;  fresh->right = nullptr;   if (head == nullptr) {  head = tail = fresh;  } else {  tail->right = fresh;  tail = fresh;  } }  int main() {  DNode\* head = nullptr;  DNode\* tail = nullptr;   cout << "Enter 5 strings:\n";  for(int i=1;i<=5;i++){  string s;  cin >> s;  pushBack(head, tail, s);  }   displayList(head);   cout <<"Enter a string to append: ";  string extra;  cin >> extra;  pushBack(head, tail, extra);   displayList(head);  return 0; } |
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### **Q.4) Write a program that builds circular linked lists of 3 nodes. The data field of the linked list shall contain the integer value:-**

| #include<bits/stdc++.h>  #include<iostream> using namespace std;  struct CNode {  int data;  CNode\* next; };  CNode\* makeCircular(int n) {  CNode\* head = nullptr;  CNode\* last = nullptr;   cout << "Enter " << n << " integers:\n";  for (int i=0; i <n; i++){  CNode\* fresh = new CNode;  cin >> fresh->data;  fresh->next = nullptr;   if (head==nullptr) head = fresh;  else {  last->next = fresh;  }  last = fresh;  }  last->next = head;  return head; }  void traverseCircular(CNode\* head, int n) {  cout << "Circular list values:\n";  CNode\* temp = head;  while(n--){  cout << temp->data << " ";  temp = temp->next;  }  cout << endl; }  int main() {  CNode\* start = makeCircular(3);  traverseCircular(start, 3);  return 0; } |
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